6450-01-P

DEPARTMENT OF ENERGY

National Transmission Grid Study 2001

AGENCY: Department of Energy

ACTION: Notice of public workshops.

SUMMARY: This notice announces the National Transmission Grid Study, a set of public workshops, and request comments. President George W. Bush unveiled his National Energy Policy (NEP) on May 17, 2001. Included in the NEP were 105 recommendations to produce more reliable, affordable and environmentally clean energy. One of the recommendations directed the Secretary of Energy to examine the benefits of establishing a national electrical grid, identifying major transmission bottlenecks and remedies to remove them. This National Transmission Grid Study 2001 (NTGS 2001) will identify the major transmission bottlenecks across the U.S. It will examine both the technical and economic issues resulting from these transmission constraints and provide innovative solutions to reverse these trends. A 21st century transmission super highway that utilizes new technology to ensure reliability will be the driver that serves the growing needs of our economy. A vibrant and reliable transmission system is essential to lowering the cost of electricity for customers all across the country. The NTGS 2001 will recommend regulatory and market based approaches that will stimulate new investment in our interstate bulk power transmission systems. The NTGS 2001 team will work with our nation's Governors to ensure that state's views are heard in the process of developing this study.

DATES: DOE will host public workshops at the following dates, times and locations. The agenda and subject matter will be the same for each workshop. Those planning to attend the workshops should register at www.ntgs.doe.gov

-September 24th / 9:00 a.m. – 4:00 p.m./ Detroit, Michigan.

Detroit Marriott Romulus
Metro Airport
30559 Flynn Drive
Romulus, MI 48174

-September 26th / 9:00 a.m. – 4:00 p.m./ Atlanta, GA.

Hyatt Regency
265 Peachtree Street NE
Atlanta, GA 30303

-September 28th / 9:00 a.m. – 4:00 p.m./ Phoenix, Arizona

Phoenix Airport Marriott
1101 North 44th Street
Phoenix, AZ 85008

Public Participation: The workshops are open to the public. If you would like to submit written comments, they can be submitted at a workshop or to either address below on or before October 10, 2001. E-mailed comments are recommended.

ADDRESSES: Send comments to: www.ntgs.doe.gov or Paul Carrier, Office of Policy and International Affairs (PI-22), US Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585.

FOR FURTHER INFORMATION CONTACT: NTGS 2001's web site at www.ntgs.doe.gov or contact Paul Carrier, NTGS 2001 DOE Program Office of Policy and International Affairs (202) 586-5659. Vincent DeVito, NTGS 2001 Counsel (202) 586-8660.

SUPPLEMENTARY INFORMATION: The purpose of the workshops is to address and solicit comments on the NTGS 2001 and, in particular, on the following issues identified by the study team to facilitate discussion.

-**Transmission Planning and the Need for New Capacity**. The character of transmission planning is changing dramatically as the structure of the U.S. electricity industry shifts from one dominated by vertically integrated utilities to one in which new and evolving regional transmission organizations will be primarily responsible for these plans. In addition, the emergence of wholesale electricity markets changes the details of transmission planning in many ways, most of which are still in flux. These changes in industry structure raise important issues about transmission planning and the need for new transmission capacity, including: (1) the need for clear transmission-planning criteria, which includes appropriate measures and consideration of reliability and commerce as well as siting and other environmental effects; (2) the integration of planning for transmission, generation, and demand-side management programs (including consideration of nontransmission alternatives that can meet reliability requirements and commercial needs); (3) the role of new technologies that might reduce the need to build large transmission facilities; (4) the need for high-quality data and projections on the types, timing, size and locations of new generating units and on the magnitudes and shapes of customer loads; (5) the need for advanced planning methods that can deal with a multiplicity of alternative futures; (6) the role of merchant (unregulated, for-profit) transmission projects; (7) the possible effects of new transmission facilities on the ability of some generators to artificially raise market prices for energy; and (8) the potential

benefits of proactive transmission plans that can guide future investments in, and the locations, of generation and demand-management programs.

-**Transmission Siting and Permitting**. In recent years, two conflicting trends have caught the attention of energy policy officials and the electricity industry. One is that across the nation the need for electricity transmission system improvements is growing; in fact, it has already become urgent in some areas. The other is that it has become increasingly difficult to obtain approvals from pertinent state and federal agencies for the siting and construction of proposed major additions or upgrades of the nation's electric transmission grids. Further, although bulk power markets now span large multistate regions, the existing regime for siting and permitting of transmission facilities remains fundamentally state based. This regime may not be well adapted to reviewing proposed new transmission facilities from a regional perspective. The policy options for addressing transmission siting and permitting in a restructured electricity industry fall into three major categories: (1) options to establish regional or federal siting institutions with authority to obtain rights-of-way for new transmission projects; (2) options to improve the existing state-based regime for transmission siting; and (3) options that could improve siting practices by government agencies and the electricity industry under any governance structure.

-**Business Models for Transmission Investment and Operation**. A common theme in restructured electricity systems around the world is the unbundling of generation, transmission, and distribution and the creation of independent transmission entities that link competitive generation to regulated distribution. The restructured transmission entities can encompass three business functions: system operation, market operation, and

grid ownership. To a large extent, current transmission sector business models are based on the previous grid ownership structure and on political expediency. In the U.S. where a large portion of the electricity grid is owned by investor-owned utilities, formation of non-profit Independent System Operators (ISOs) to control but not own deregulated transmission assets was a convenient approach that enabled restructuring to move forward without requiring utilities to divest their transmission assets. By contrast, in countries such as the U.K. or Spain where the government or private entities previously owned the transmission assets, restructuring entailed formation of for-profit independent transmission companies (ITCs). Both the ISO and ITC business models have strengths, weaknesses, and multiple variants. Federal Energy Regulatory Commission (FERC) order 2000 and subsequent orders concerning the formation of Regional Transmission Organizations (RTOs) do not identify a preferred business model for transmission functions. The need to evaluate alternative business models for transmission enterprises is prompted by the moves toward large RTOs, current experiences with the ISO structure and the development of RTO proposals that advocate formation of for-profit ITCs. Key issues related to the choice of business model for RTOs include the political feasibility of different models as well as their effects on: (1) market efficiency; (2) system reliability; (3) operational efficiency; (4) transmission access and interconnection policies; (5) transmission system investment and innovation; and (6) governance and regulatory oversight.

-**Operation of Interconnected Transmission Systems**. Electric power systems were originally interconnected for two purposes: reliability and economy. Operation protocols evolved for the interconnected system that permitted maintenance of system frequency,

monitoring of trades between regions, and the prevention of major power outages as the result of single contingencies such as the sudden loss of any system component. Interconnection also led to a variety of problems: loop flows, inter-regional stability concerns, and issues associated with management and coordination of a very large, diverse set of generators and loads. The advent of competitive energy markets has blurred the sharp distinction between reliability and economy so that reliable service may become a commodity. In addition, the voluntary cooperation by which utilities and others involved in system operation performed their tasks has been difficult to maintain as former partners become competitors. Two main approaches for dealing with short-term reliability issues (particularly congestion of components) have evolved: the first approach is a system whereby parties that are engaging in transactions curtail them according to prescribed rules whenever reliability becomes a concern. The transmission loading relief (TLR) protocol is the embodiments of this approach. The second approach is market-based in which spatial price patterns are created that lead market participants to relieve congestion through actions taken in their own self-interest. Locational pricing, such as nodal pricing, "flowgate" pricing, and to a lesser extent zonal pricing, are embodiments of this second approach. Issues of concern for operation of interconnected power systems include: (1) Could the entire U.S. electricity grid be operated as one integrated whole or a few large integrated markets? (2) How could we assure reliability of such an integrated or national electricity grid? (3) What are the merits of and appropriate relationship between "mandated" approaches (e.g., reliance on TLR protocols), and "market-based" approaches, such as real-time and day-ahead markets to ensure system reliability?

-**Reliability Management and Oversight**. Assuring power system reliability is both a physical and organizational activity. Specific activities must take place but they do so within a commercial and political framework. Determining who sets the rules for power system reliability and how may be the most challenging aspect of maintaining reliability in a restructured electricity industry. Historically, the vertically integrated utility industry utilized the North American Electric Reliability Council (NERC) a bottom-up, industry-dominated, volunteer organization to establish reliability rules and monitor compliance. The restructured industry will require a more open and inclusive process for establishing mandatory standards and monitoring and enforcing compliance. To assure reliability the following issues need to be addressed: (1) the physical constraints and requirements of the electricity system; (2) who should make decisions about reliability and the technical and economic bases for those decisions; (3) who takes what risk (communal versus individual risks); (4) how reliability costs are assessed; (5) how to address the inevitable disputes that will arise over reliability decisions; (6) what should be the scope of reliability decisions (regional vs. national); (7) how to assess alternative means of supplying reliability services (including the use of customer loads as reliability resources), and how technology is expanding these options; and (8) evaluating proposed institutional structures for insuring reliability.

-**New Transmission Technologies**. Electric industry restructuring is based in part on the assumption of a transmission system that is flexible, reliable, and open to all exchanges no matter where the suppliers and consumers of energy are located. However, neither the existing transmission system nor its management infrastructure can fully support this open exchange. Some desirable market transactions are quite different from those

envisioned when the transmission system was designed, and they may stress the limits of safe operation. The risk posed by such transactions may not be recognized in time to avert major system emergencies, which may be difficult to manage without loss of customer load. It is also increasingly common for one transaction to interfere with others, producing "congestion" in the system. These problems can be remedied in part by direct technical reinforcements to the transmission system, in the form of improved hardware technology. Another need is for indirect reinforcements to the general infrastructure for grid operations and planning. Progress in both areas has, for many years, been hampered by electricity restructuring. This process is far from complete, and it has greatly weakened the essential dialog between technology developers and technology users. Development of new technology must be closely linked to its actual deployment for operational use. Together, both activities should reflect, serve, and keep pace with the evolving infrastructure needs of transmission organizations. This is not happening. Neither the details nor the needs of this infrastructure are well known, and all parties are understandably averse to investments that may not be promptly and directly beneficial to them. As a result many promising technologies are stuck at various points in the "pipeline" from concept to practical use. Included among them are superconducting equipment, large scale devices for routing power flow on the grid (HVDC and FACTS), real time operating tools for enhanced management of grid assets, and a new generation of system planning methods that are robust against uncertainty. A critical issue is that some enabling technologies for healthy and reliable electricity commerce are not attractive to individual commercial entities, but should be developed and deployed in furtherance of the public good. To summarize, key issues include: (1)

the capability and cost of new technologies to improve operation of the transmission system; and (2) the requirements of and institutional options available to support timely development and deployment of these technologies through the current period of industry restructuring.

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